UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: SEP 10 1992

SUBJECT: Draft Revised Feasibility Study: L.E. Carpenter and Company Site, Borough of Wharton, Morris County, New Jersey.

FROM: Dore LaPosta, Chief
Groundwater Management Section

TO: Raymond Basso, Chief
New Jersey Superfund Branch II

As requested and in accordance with the Memorandum of Inter-divisional Coordination between the Emergency and Remedial Response Division (ERRD) and Water Management Division (WMD), WMD has reviewed the Draft Revised Feasibility Study: L.E. Carpenter and Company Site, Borough of Wharton, Morris County, New Jersey, from the perspective of the Water Programs. We offer the following comments:

- Although an RI and Supplemental RI have been conducted at the site to determine the nature and extent of contamination, the investigations are still not entirely conclusive regarding the extent of groundwater contamination. The conclusion that groundwater contamination is localized in the shallow zone of the glacial/alluvial aquifer may be attributed to a lack of monitoring wells screened in this zone within the central plume area. The potential for bedrock aquifer contamination also can not be ascertained due to this data gap. MW-11d drillers logs indicate significant vertical fractures in core samples from this well. The vertical component of contaminant migration in the bedrock may predominate. Note that the second round of sampling (1/25/90) revealed BNA contamination in MW-11d, and this may represent a migrating bedrock plume since this well is downgradient to the shallow zone plume. Consequently, we advise that a contingency be included should future sampling result in detections of contaminants in the bedrock wells. Additional intermediate zone monitoring wells should be installed in the intermediate zone between the MW-11 cluster and the MW-14 cluster. Additional sampling of selected wells should be undertaken to determine the extent of plume migration in the almost two years since the 1/25/90 sampling event.

- The second paragraph on page 1-23 of Section 1.6.6 Groundwater notes that Intermediate groundwater is not included in the remedial options presented in the FS. While contaminant detections in intermediate wells were of a relatively low frequency, no valid conclusion regarding the extent of contamination in this zone can be made since **there are no wells screened in this zone in the area of maximal shallow zone contaminant detections.** Since the "shallow" and the "intermediate" zones are arbitrary delineations within an apparent homogeneous aquifer system, and since

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detected contaminants tend to be denser than water (DNAPLs), it is not unlikely that the intermediate zone is also contaminated. Unless additional data is acquired which supports elimination of the "intermediate" zone from remedial action consideration, it should be included with the "shallow" zone as a contiguous hydrogeologic unit.

- The third paragraph on page 1-23 of Section 1.6.6 Groundwater eliminates the bedrock (deep) groundwater from consideration for remedial action. Like the "intermediate" zone **there are no wells screened in this zone in the area of maximal shallow zone contaminant detections.** The DNAPL nature of many organic contaminants suggests that downward migration will be a prominent transport mechanism. Fracture zones are currently undefined at the site, and contaminant migration into vertical fractures may be undetected due to the location of bedrock wells outside of the identified shallow zone contaminant plume. The detection of site related contaminants in MW 11d in the second round of sampling suggests contaminant migration into bedrock fractures within the time between sampling episodes. Since almost two years have elapsed since the second sampling event, spatial characteristics of contamination may have changed. Significant bedrock contamination cannot be disregarded on the basis of the RI results. Potential bedrock aquifer contamination should not be discounted unless additional sampling in areas of identified shallow and/or intermediate zone contamination justifies a decision to exclude it.

- Some groundwater samples may have been subjected to severe in-situ dilution. Screen lengths on monitoring wells range from about 5 feet in length to over 70 feet (eg MW-5). The EPA Region II CERCLA QA Manual specifies screen lengths of no more than 10 feet since significant dilution will likely occur if longer screens are used. Consequently, groundwater sample data from wells constructed with screen lengths greater than 10 feet long must be considered with caution and possibly skepticism.

- The variable continuity of the clay layer in the northeast portion of the site including the Wharton Enterprise property should be clearly noted. Figure 3-4 of the Supplemental RI report portrays the clay layer as extending over a broad extent in this region. The drilling log for the MW-14 cluster indicates that clay was not encountered during drilling of this well, but the clay is shown on the figure to extend over this well. Disruptions in the clay provide a route for hydraulic connection and contaminant transport. Known and potential clay layer discontinuities in this downgradient portion of the site should therefore be clearly noted.

- The MW-14 well cluster is reported to harbor a bedrock well (MW-14d). The drilling log for this well indicates "refusal at bedrock" and consequent termination of drilling. MW-14d is not a bedrock well, but is - at most - screened in the lower zone of the glacial/alluvial deposits. Also, artesian conditions encountered at MW-14d during various water level determinations should be evaluated with respect to its unconfined location.

- In the final sentence of Section 6.2.1.1 Description of (No Action) Alternative on page 6-5, and in the final sentence of Section 6.2.2.1 Description of (Institutional Controls) Alternative on page 6-8, phthalates, total organic carbon (TOC), and biochemical oxygen demand (BOD_5) should be included parameters.

- The first paragraph on page 5-9 in Section 5.4.1 Development of the Initial Groundwater Collection System discusses use of a drawdown simulation derived using the PT1 computer model. Appendix A provides input and output parameters. However, the model's utility may be limited by the type and number of assumptions, as well as the mathematical technique utilized to derive a solution. Consequently, analogous to Table 5-1, a description of the PT1 model including all assumptions, mathematical techniques, code language, and sensitivity should be included.

- The final sentence of the first paragraph on page 5-16 in Section 5.4.2 Estimate of Treatment System Influent Concentration notes the necessity of an aquifer pump test as an element of the remedial design process. Contaminant partitioning between pore water and aquifer material will be a major factor controlling the duration of pump-and-treat operations. Subsequent to extraction of the first few pore volumes, contaminant concentrations will likely attenuate, perhaps to analytical non-detect values. However, cessation of the extraction operation will reduce groundwater flow velocities, and will favor equilibrium partitioning between adsorbed contaminants and groundwater. Contaminant concentrations in groundwater will likely increase substantially after pumping has been discontinued. Even approaching the aquifer restoration remedial objective will almost assuredly require an extended period of pumping - far beyond that projected for removal of contaminated groundwater.

  Pulse pumping - a scenario which utilizes the enhanced mass transfer of contaminants from the adsorbed phase to the aqueous phase after pumping has ceased - should be evaluated in design as an operational methodology. Utilization of this scenario has the potential of decreasing capital and

operating costs since maintenance of hydraulic loadings during operation can be maintained by sequential pumping in discrete contaminated zones. Combinations of column and batch desorption studies utilizing samples of representative aquifer material from the site and background groundwater are the most useful methodologies for estimating the duration of remedial activities as well as simulating and optimizing pulse pumping operations. Performance of these studies should be initiated early in the remedial design process.

- An additional complicating factor is the potential presence of separate phase dense non-aqueous phase liquids (DNAPLs). DNAPLs, such as phthalates, may pool on confining layers or in areas where the relative hydraulic conductivity decreases. DNAPL can migrate as a separate phase along the slope of relatively low hydraulic conductivity layers and therefore, potentially, in a different direction than groundwater flow. Also, DNAPL can penetrate into deeper aquifer zones via gaps or cracks in confining beds. All of these issues are at the technical forefront of contaminant hydrogeology and groundwater remediation, and are the subject of recent EPA technical reports and guidance. Groundwater at the Carpenter site is contaminated with DNAPL, past practices suggest DNAPL inputs to the ground, thus the potential presence of a separate phase DNAPL plume in the aquifer cannot be ignored. Such a plume may be impacting the intermediate and bedrock zones even though it is currently undetected. Consequently, we recommend that the potential presence of a mobile DNAPL source be acknowledged so that the remedy may be inherently flexible with respect to DNAPL contamination.

- Treatability studies are reported to have evaluated soil flushing and in-situ bioremediation. Since reports on these studies have not been provided, we cannot adequately assess the viability of these technologies as determined for the site. However, soil flushing and in-situ bioremediation are complementary technologies which could, in combination with groundwater extraction and treatment, best serve to obtain both groundwater and soil remedial objectives in a timely manner. We request that the treatability study reports be forwarded to us for review as soon as they are available. Since the FS report relies on these studies for development and screening of technologies, we suggest that the treatability studies be appended to the FS report. We will withhold comment on the suggested remedial alternative Alternative 3 Closure until we have had the opportunity to review this critical data.

In the first paragraph of Section 4.3.7.2 Anaerobic Biological Treatment on page 4-37 *carbon monoxide* should be

changed to *carbon dioxide*: *soluble organics* should be changed to *hydrogen gas; and organic acids, alcohols, and amines*.

If you have any questions regarding these comments, please call Dennis McChesney of my staff at extension 5543.

cc: R. Hargrove, EIB
J. Josephs, NJSB II/ERRD